**Report**

**UML Diagram**

Diagram

Description automatically generated

**Member Ship Function**

**Pressure**

Chart

Description automatically generated

**Frequency**

Chart

Description automatically generated with low confidence

**Intersection**

In the case of the[intersection of crisp sets](https://codecrucks.com/crisp-set-operations/), we simply have to select common elements from both sets. In the case of fuzzy sets, when there are common elements in both the fuzzy sets, we should select the element with minimum membership value.

Graphically, we can represent the intersection operation as follows: Red and blue membership functions represent the fuzzy value for elements in sets A and B, respectively. Wherever these fuzzy functions overlap, we have to consider the point with the minimum membership value.

Chart, line chart

Description automatically generated

**Union**

In the case of the [union of crisp sets](https://codecrucks.com/crisp-set-operations/), we simply have to select repeated elements only once. In the case of fuzzy sets, when there are common elements in both the fuzzy sets, we should select the element with the **maximum membership value**.

Graphically, we can represent union operations as follows: Red and Blue membership functions represent the fuzzy value for elements in sets A and B, respectively. Wherever these fuzzy functions overlap, we have to consider the point with maximum membership value.

Chart, line chart

Description automatically generated

**Defuzzification**

It is the inverse of fuzzification. Fuzzification is used to convert the crisp results into fuzzy results but here the mapping is done to convert the fuzzy results into crisp results. This process is capable of generating a non-fuzzy control action which illustrates the possibility distribution of an inferred fuzzy control action. Defuzzification process can also be treated as the rounding off process, where fuzzy set having a group of membership values on the unit interval reduced to a single scalar quantity. [Defuzzification methods](https://codecrucks.com/defuzzification-what-why-and-how/) are used to convert defuzzified output of fuzzy inference engine to crisp value. The common methods used are [maxima methods](https://codecrucks.com/maxima-methods-for-defuzzification-fom-lom-and-mom/), [Center of Gravity (CoG)](https://codecrucks.com/center-of-gravity-method-for-defuzzification/) method, [Center of Sums (CoS)](https://codecrucks.com/center-of-sums-cos-method-for-defuzzification/) method, [Center of Largest Area (CoA)](https://codecrucks.com/center-of-largest-area-method-for-defuzzification/) method etc.

Chart, line chart, histogram

Description automatically generated

Chart, line chart

Description automatically generated